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A NEW GENUS OF BLIND BEETLES OF THE FAMILY LUCANIDAE (COL.)

By Gilbert J. Arrow, F.R.E.S.

(*British Museum* (*Natural History*).)

The discovery of a blind form in a group so nearly homogeneous as the Lucanidae, which moreover has received for many years an exceptional amount of attention from collectors and systematists, is a very unexpected event. The little insect here described has been found in the island of Mauritius by Mr. Jean Vinson, who discovered both larvae and adults beneath stones and a decaying log within a very restricted area upon the summit of a mountain crest. Its manner of life is therefore highly peculiar, and it is rather remarkable that, apart from its blindness and evident inability to fly, it shows little specialisation in its general structure for its exceptional environment. Wings are present but much reduced, and certainly useless for flight; of eyes there is no trace at all externally. There is an evident analogy, although little actual relationship, with the wingless Lucanid genus *Colophon*, the rather numerous species of which are confined to isolated mountain summits in South Africa. The seemingly severe disabilities of these insects probably serve to reduce the risk of dispersal of the colonies from their exposed situations.

Vinsonella gen. n.

Corpus parvum, angustum. Pedes breves, tarsis quam tibias multo brevioribus. Tibiae anticae productae, extus acute dentatae, apice breviter furcatae; tibiae 4 posteriores extus unispinosae, apice bispinosae. Antennae 10-articulatae, breves, funiculo compacto, clava triphylla, setosa, compacta, bene producta. Oculi nulli. Mandibulae sat breves, extus arcuatae, intus breviter bidentatae. Mentum magnum, convexum. Pronotum angustum, postice rotundatum, angulis posticis nullis. Prosternum postice paulo elevatum, haud angulatum. Scutellum angustum, angulatum. Elytra crebre punctatosulcati, humeris acutis. Alae reductae.

Genotype: *V. caeca* sp. n.

Vinsonella caeca sp. n.

Nigra vel piceo-nigra, nitida, angusta, modice convexa, corpore supra nudo, subtus fortiter punctato et parce setoso, capite transverso, bene haud crebre punctato, antice laeviori et utrinque tuberculo parvo armato, maris angulis anticis lateraliter prominentibus et lateribus fere parallelis, postice abrupte contractis; pronoto longitudine fere ad latitudinem aequali, fortiter haud crebre punctato, antice medio laeviori, lateribus rectis, fere parallelis, angulis anticis productis, haud acutis, posticis nullis, basi rotundato; elytris sulcatis, sulcis fortiter seriato-punctatis, humeris acute angulatis, apicibus rugose punctatis; corpore subtus fortiter punctato, capitis lateribus grosse, metasterno aequaliter sat crebre, abdomine haud crebre, punctatis; ♂, mandibulis perpaulo elongatis, antice leviter recurvatis, ♀, mandibulis rectis.

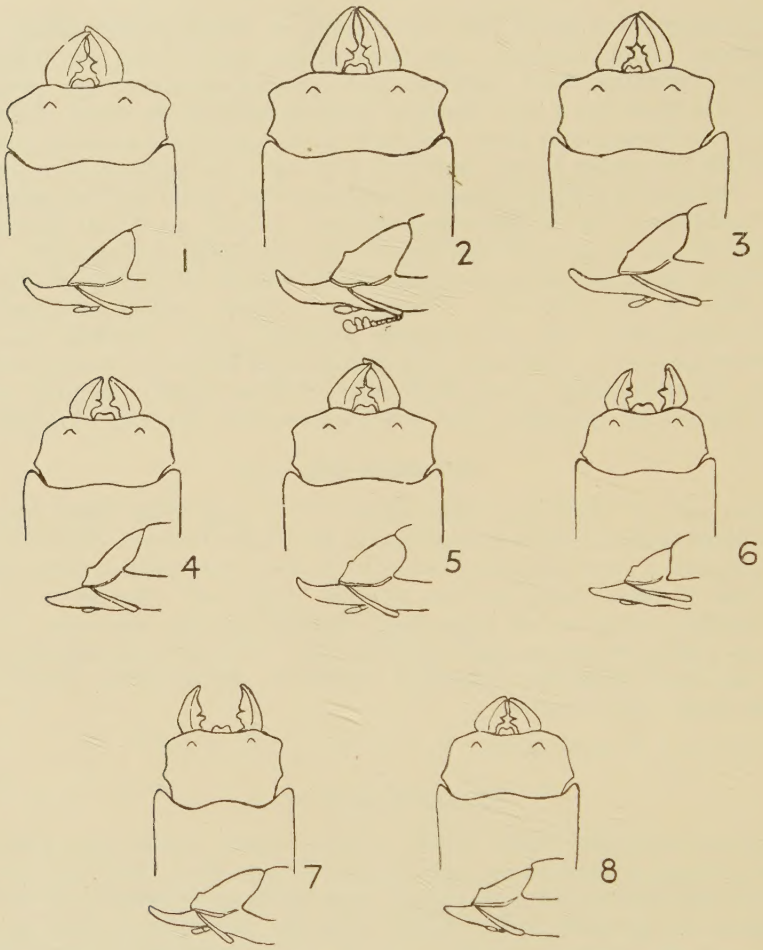
Long. (cum mandibulis) 8–10 mm. (absque mandibulis) 7–9 mm.; lat. max. 3 mm.

Mauritius: Mont Cocotte, 2450 ft. (November).

Type in the British Museum.

Ten specimens of this remarkable insect were found under stones and two

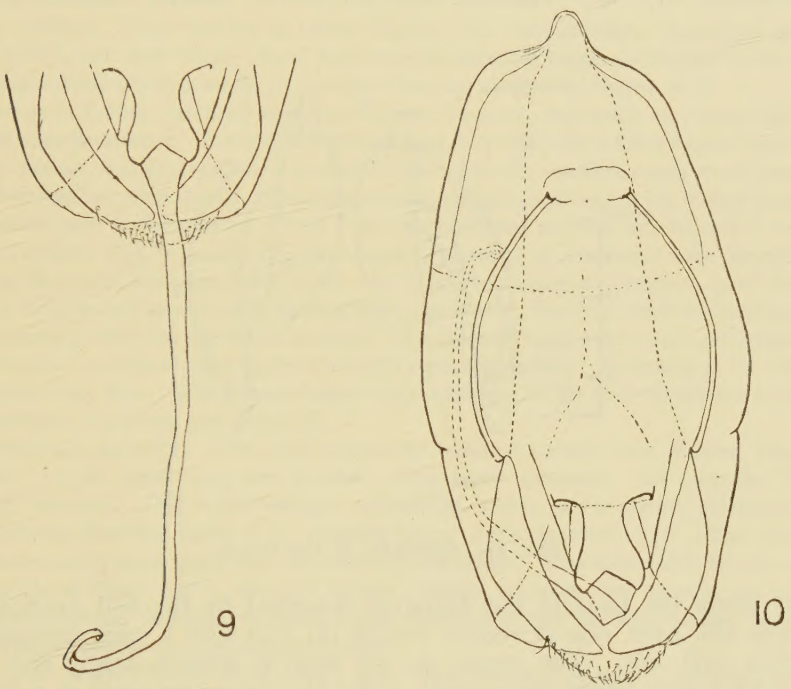
beneath a decaying log. It has a superficial resemblance to the genus *Figulus*, but probably a nearer relationship to *Aegus*. It has the narrowly elongate shape and sulcate elytra, as well as the narrow scutellum, of the former genus, but, in addition to the total absence of eyes, differs in various important features. The antennae are entirely different. The three terminal joints, instead of being little produced, smooth and highly chitinised, are relatively large, strongly produced, spongiose and thickly clothed with hair. The middle



Figs. 1–8.—Dorsal and lateral aspects of head and mandibles; 1–3 male; 4 female; 5 male; 6 female; 7 male; 8 female.

and hind tibiae have each a single strong lateral spine, instead of several, as in *Figulus*; the front tibia is produced far beyond the point of origin of the tarsus, its tip is forked, but not strongly, and its outer edge bears four sharp teeth. There is a distinct pulvillus between the claws. The mentum is without the raised basal margin found in *Figulus*. The sides of the head are abruptly contracted behind, forming an angular projection which meets the produced

front angles of the prothorax. They are almost parallel in the male, but converge anteriorly in the female. There is a small pointed tubercle on each side behind the front margin, in exactly the same situation as in various species of *Aegus* and *Dorcus*. The lower surface, including the mentum, is very coarsely pitted, except for a smooth, finely striated area where the eyes would normally be found. The pronotum is almost as long as it is wide, the sides are straight and almost exactly parallel, the base strongly rounded, obliterating all trace of hind angles, and there is a strong basal margin. The scutellum is small, narrow and pointed. The elytra are long, almost parallel-sided, narrower at the base than the prothorax, with the shoulders acutely angular. The prosternum is narrow between the coxae, a little elevated behind them, rounded and not pointed at the end.



FIGS. 9–10.—Genitalia of the male; 9 with flagellum extended; 10 with flagellum enclosed.

The larva, found in the same situation as the adults, is long and slender, the hind-leg bears a well-developed stridulatory process, with very regular, hard, transverse ridges, and the granular stridulatory area at the base of the middle-leg is bordered by a straight line of large granules. The legs have sharp terminal claws. The last sternite has a double " raster " of not very numerous spines separated by a smooth median area. These features provide confirmation of the affinity with the genus *Aegus* indicated by the structure of the adult.

Mr. Vinson has kindly made for me drawings of the fore-part of a series of the specimens taken by him, showing the range of variation, as well as the sexual differences. He has also supplied the following account of the conditions under which the insects are found.

" Mount Cocotte, the mountain on which the beetle lives, is a narrow ridge in the south-west of the island, with a maximum elevation of approximately 2450 feet. Its annual rainfall is very high, exceeding 175 inches and probably 200 inches in some seasons. It is the coolest part of the island, and during the winter months the temperature may frequently fall to 50 deg. F. The endemic vegetation it bears has been termed ' mossy forest,' on account of the intense development of ferns, mosses and hepatics. As such it is unique in Mauritius.

" I do not think this insect is likely to be found in other parts of the island —nowadays, at least. The light powdery soil or peat in which it lives is not found in other places in Mauritius and immediately recalls the type of soil where I have collected *Amneidus* in Reunion. [*Amneidus* is another genus of Lucanidae, G. J. A.] This soil from Mt. Cocotte (sample collected under a

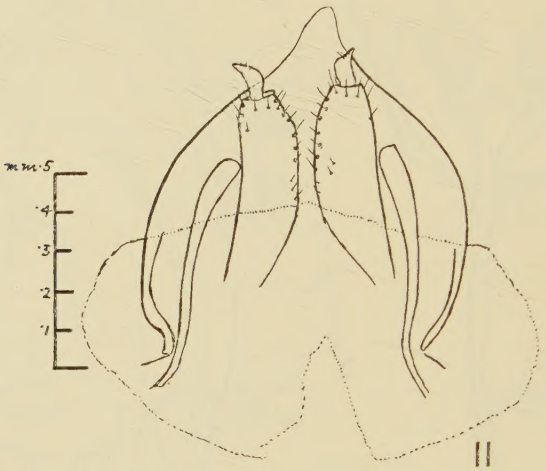


Fig. 11.—Genitalia of the female.

stone where the Lucanid was found) is described by the Soil Analyst as a ' humic soil layer, rich in organic matter (21·7%) with a very strongly acid reaction (pH 4·5).' The insects do not seem to burrow deeply and in all cases have been found immediately under the stone, generally in a kind of horizontal tunnel. They may find some tiny roots or remains of roots in this soil, but I wonder if they do not subsist solely on its humus contents. Out of the twelve adults hitherto collected ten have been found under stones and two under a decaying trunk. They are usually found two by two under one stone (probably male and female, but unfortunately I have not kept separately all the specimens collected, except in one case, where they were definitely a couple). Four larvae were observed in the same situation as the adults, but three of them were under the decaying log.

" The optimum conditions of development for this insect would seem rather narrow, for it is not found all over the mountain. The ten adults collected under stones have been found on the same patch situated on the very crest of the ridge and measuring roughly 100 square yards, but the log under which the two others were captured was 400 to 500 yards distant from the first place."

A NEW INDIAN GENUS AND SPECIES OF TETTIGONIIDAE (ORTHOPTERA)

By G. M. Henry, F.R.E.S.

(*Assistant in Systematic Entomology, Colombo Museum.*)

Phaneropterinae.

Execholyrus gen. n.

Size medium. Form similar to *Letana* Walker, but more slender. Coloration green, varied with brown and black. Male tegmina specialised at bases, as detailed below. A hirsute, glandular alluring organ on dorsum of second abdominal tergite in ♂.

Head as in *Letana*, but frons narrower between scrobes. Antennae very long, filiform. Eyes globose, prominent. Pronotum saddle-shaped, but with lateral lobes longer than high, without median or lateral carinae or median sulcus; dorsally rounded, concave on posterior lobe; humeral bay pronounced. Tegmina narrow, straight, rounded at tip, evenly tapering from widest part in basal third. Vein *C* distinct, but not pronounced, *Sc* and *R* nearly straight, running closely parallel almost to apex of tegmen; *Rs* leaving *R* near the middle; *R* giving off several branches distal to *Rs*. In ♂, posterior margin of tegmen, immediately distal to stridulatory area, deeply and suddenly excavated, forming a hiatus which exposes the metanotum when the tegmina are closed. Stridulatory areas of ♂ small and somewhat quadrangular; mirror of right tegmen broadly cordate, hyaline. Striations of file-vein of left tegmen very fine. Wings much longer than tegmina, rather narrow, similar to those of *Phaneroptera* in shape and structure.

Prosternum unarmed; meso- and metasterna transverse, their lobes oblique, broadly rounded. Limbs rather long and slender. Fore coxae unarmed. All genicular lobes rounded, unarmed. Fore femur straight, cylindrical, widely and shallowly sulcate below in ♂, narrowly flattened below in ♀; sparsely armed antero-ventrally with minute spines. Hind femur compressed, not greatly incrassated proximally. Fore tibia suddenly narrowed distal to the auditory region, strongly sulcate dorsally, at most very sparsely spined on outer dorsal carina, unarmed on inner dorsal, sparsely armed on both ventral carinae; auditory organ conchate in front, open behind.

Male anal tergite truncate-emarginate; supra-anal plate semi-elliptical; cerci cylindrical tapering, acuminate; subgenital lamina produced, distally flattened and deeply cleft without styles.

Ovipositor rather large, not greatly swollen laterally at base, of the shape shown in fig. 1e, its surface nearly smooth, its dorsal and ventral margins finely and regularly serrated; ♀ subgenital lamina transverse, triangular.

Genotype : *Execholyrus allector* sp. n., described below.

This genus comes nearest to *Hemielimaea* Brunner, which it resembles in structure of pronotum, limbs, etc., and in the general structure of ♂ genitalia; it differs in ♀ genitalia, and is sharply distinguished from all its nearest relatives by the extraordinary gap in the hind margin of the ♂ tegmen, behind the stridulatory area. The nearest approach to this formation known to me is found in the Pseudophylline genus *Xerophyllopteryx* Rehn (*Xeropteryx* Brunner) which has the stridulatory area somewhat similarly separated by a gap from the rest of the posterior margin of the tegmen.

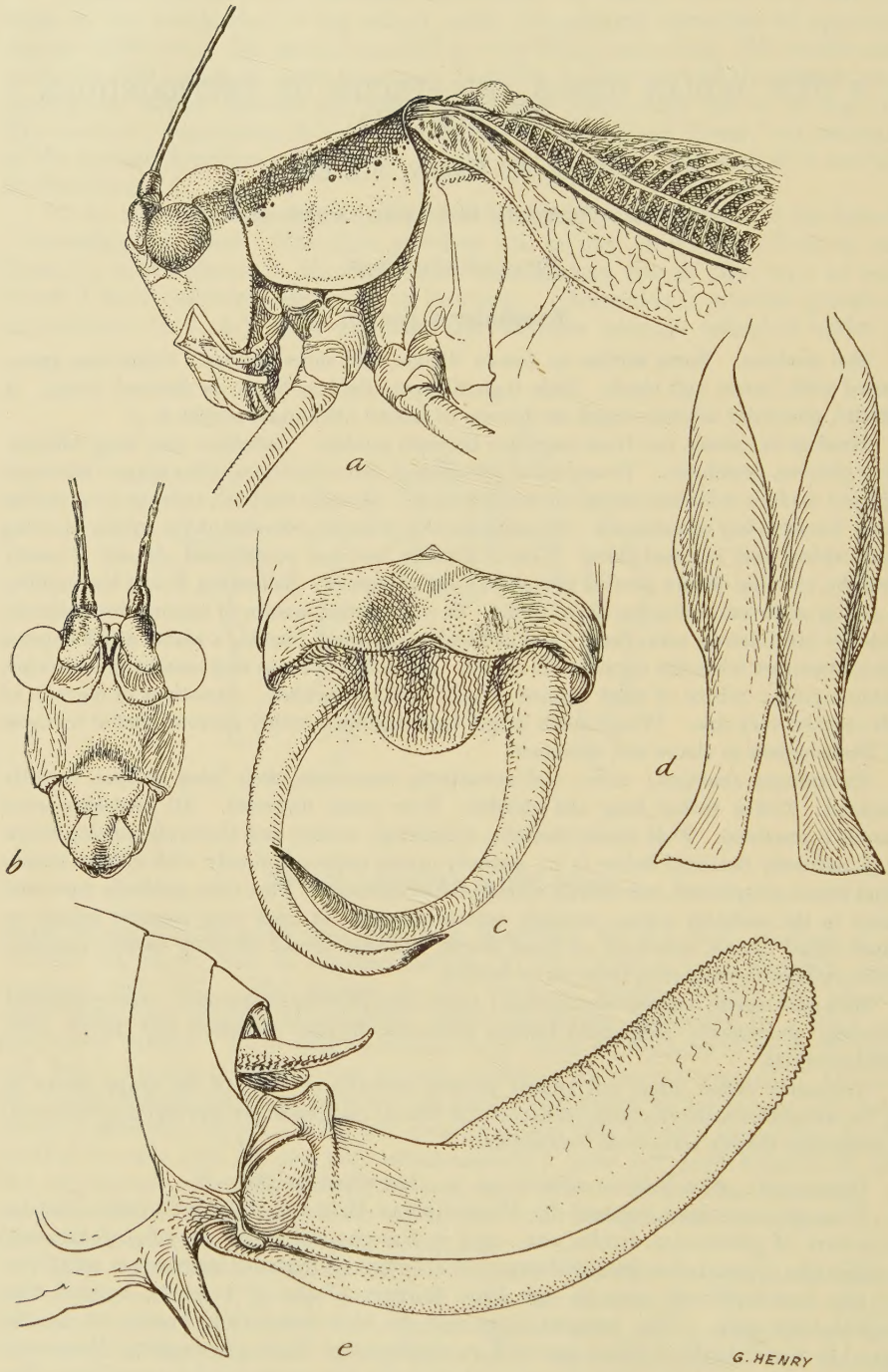


Fig. 1.—*Execholyrus allector* gen. et sp. n., (*a*) ♂, fore-part of body, × 7; (*b*) ♂, face, × 7; (*c*) ♂ genitalia, postero-dorsal, × 17; (*d*) ♂ subgenital lamina, ventral, × 17; (*e*) ♀ genitalia, × 10.

Execholyrus allector sp. n.

♂. Vertex short, gently declivent; fastigium sulcate, concave in profile, separated from frontal fastigium by a wide, angular depression. Eyes large, globose, prominent. Antennae over five times the body length. Pronotum broadly emarginate in front, broadly rounded behind; a V-shaped transverse sulcus behind middle of dorsum and a deep anterior sulcus confined to sides; lateral lobes with front margin at right angles to mid-dorsal line, feebly sigmoidally curved; their front angle rounded-obtuse, ventral margin rounded, hind margin broadly rounded, humeral bay deep and arched; surface of lateral lobes uneven. Left tegmen distinctly, right tegmen feebly, emarginate on costal margin just distal to base, thereafter convexly curved. Wings extending beyond the closed tegmina about 0·4 of the latter's length.

Genitalia. Anal tergite truncate and feebly bilobate; supra-anal plate semi-elliptical; cerci cylindrical, semi-circularly incurved and recurved, hirsute, tapering to an acute apex; the extreme tip triangular in section. Subgenital lamina gutter shaped, deeply and narrowly cleft at apex, of the form shown in fig. 1d; the sides of the cleft are setose, but have no minute black spinules such as are found in many neighbouring genera (*e.g. Elimaea*).

Coloration : antennae very dark brown, shading to black, sparsely annulated with whitish; basal segment black externally, greenish ventrally, light brown dorsally. Eyes dark brown. Face below middle of eye, mouthparts, lateral lobes of pronotum, meso- and metapleurae, sides of abdomen, fore coxa and trochanter, mid femur and tibia, hind femur except knee, apple green. Dorsum of head and pronotum brownish or greenish ochraceous, separated from the green by a brownish-black, indefinite fascia; crimson specks on dorsum of head, and black ones on dorsum and upper part of lateral lobes of pronotum. Tegmen with costal field (except extreme base, which is suffused dark brown) bright green-venulated on a brownish-ochraceous ground—general appearance being bright green; vein *R* bright yellow; remainder of tegmen dark brown, paling on left stridulatory area and apex to ochraceous; the main veins greenish, veinules pale reddish-brown; general effect dark brown, paler along anal margin. Wings with exposed part of costal area dark brown, remainder smoky hyaline with dark crimson veins. Meso- and metanota and dorsum o abdomen more or less suffused with rich carmine, which forms minute specks on the sides of tergites. Fore femur and tibia reddish ochraceous, the latter darker, with dark brown suffusion about auditory region and distal end. Mid tibia with dark brown spots at both extremities. Hind knees dark brown; hind tibia greenish ochraceous, with dark brown ventral line, proximo-dorsal spots, and distal end. Fore and mid tarsi with third segment and its pulvilli dark brown, rest more or less pale ochraceous. Hind tarsi dark brown throughout.

♀. Resembles ♂ in most features, but has slightly broader, less tapering tegmina, with no trace of the curious stridulatory specialisation. Wings extending beyond closed tegmina about 0·25 of the latter's length. Coloration similar in general to that of ♂, but less rich. Dorsum of head and pronotum paler and greener ochraceous, with black side lines only feebly indicated. Vein *R* of tegmen not conspicuously yellow, and discoidal and anal fields green as well as the costal field; dark brown intervenular spaces developed only along the posterior margin—with a few scattered spots in discoidal field. Base of anal lobe dark brown, with a diffuse pale buff spot at its distal end. Exposed part of wing green, remainder paler smoky-hyaline than in ♂. Ovipositor self green, with dorsal, apical and ventral margins chestnut. It is shaped as shown in fig. 1e. Its ventral valves at extreme base are laterally expanded into a pair of thickened, rounded or angular lobes; subgenital lamina an equilateral triangle, with the apex minutely excised; its median portion laterally compressed.

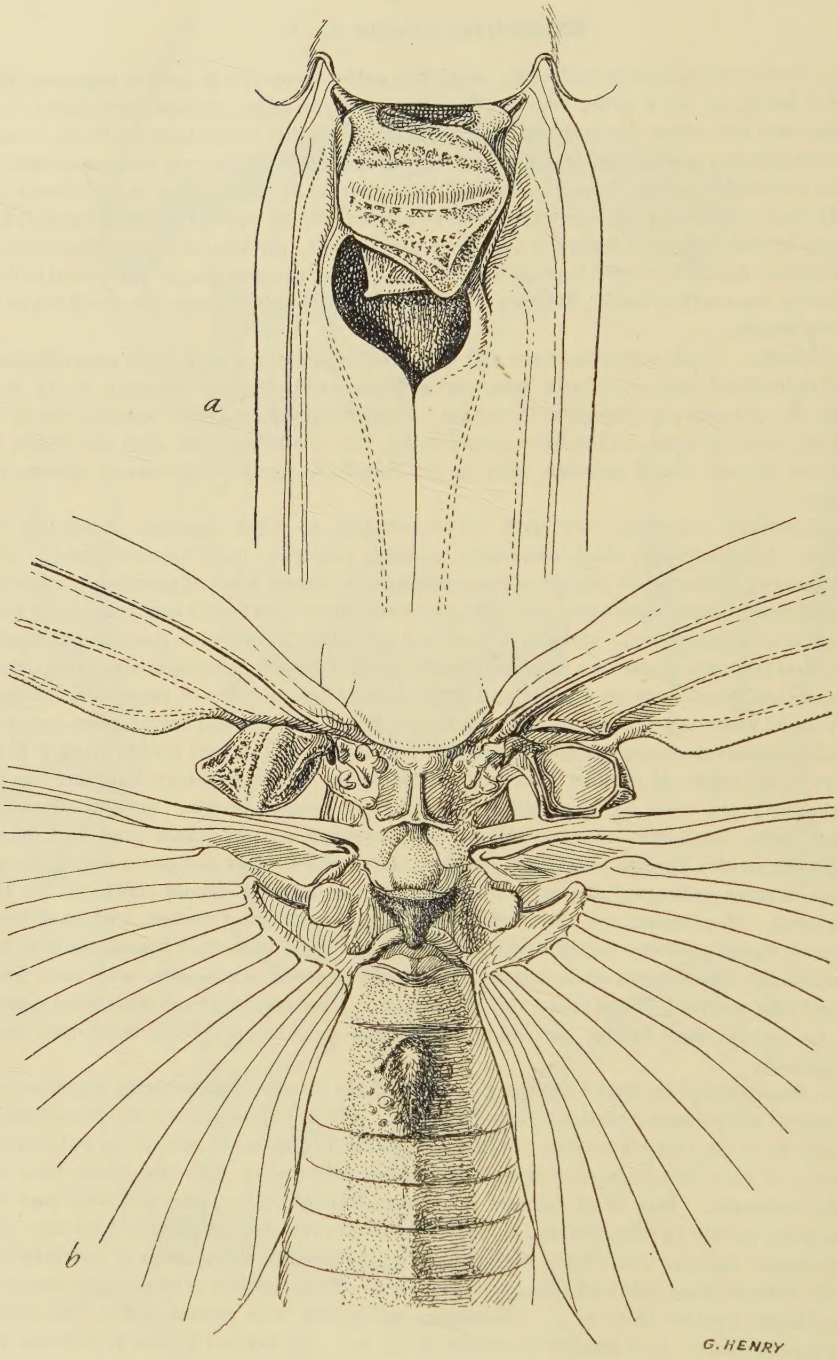


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FIG. 2.—*Execholyrus allector* gen. et sp. n., (*a*) ♂, tegminal bases, closed, × 12, showing exposure of metanotum through gaps in hind margins of tegmina; (*b*) ♂, middle portion of body, × 7, showing bases of tegmina and wings, metanotum, and alluring organ on second tergite. (Note droplets of alluring secretion.)

Measurements in mm.	♂	♂	♀	♀
Length of body, *ca*	19·5	17·9	22·4	23·0
Width of head across eyes	3·4	3·4	3·6	3·5
Length of pronotum	4·0	3·8	3·9	4·0
Length of lateral lobe	3·4	3·3	3·3	3·4
Length of tegmen	21·0	22·5	24·0	25·0
Greatest width of tegmen	3·2	3·2	4·3	4·4
Length of wing	28·0	29·0	28·5	28·5
Width of wing	12·2	?	13·5	?
Length of fore femur	5·4	5·4	6·75	6·9
Length of hind femur	19·0	20·3	23·0	22·0
Length of ovipositor	—	—	8·3	9·0

Material examined : 13 males, 10 females, all taken by the British Museum–Colombo Museum Expeditions to South India, at Tenmalai, 500 feet, Travancore, 12–15.v.1937 and 11–17.x.1938; further material is at present in the Colombo Museum, and eventually half the specimens, including the type, a male, will be in the British Museum, the remainder being retained in the Colombo Museum.

The specimens were all collected in forest surrounding the Government Forest Circuit Bungalow at Tenmalai, a timber depot on the railway connecting Trivandrum and Tuticorin. A note on the habits of the insect will be published elsewhere.

A NEW WINGLESS HYMENOPTERON (BRACONIDAE)

By G. E. J. Nixon, B.A., F.R.E.S.

(*Imperial Institute of Entomology.*)

Some time ago Dr. Masi of the Museo Civico di Storia Naturale, Genoa, sent to my colleague Dr. Ch. Ferrière a remarkable parasitic Braconid which he believed to be new and which he hoped Dr. Ferrière would find time to describe. Dr. Ferrière, however, already overburdened with his studies of the Chalcididae, has asked me to undertake the task of placing on record this interesting little insect.

Alysiinae.

Pseudopezomachus Marshall.

Ischnopus Marshall, 1905, *Ann. Mus. Stor. nat. Genova* **41** : 450.
Pseudopezomachus for *Ischnopus* Marsh. *nec* Kriechbaumer, Mantero, 1905, *Ann. Mus. Stor. nat. Genova* **42** : 49.
Libyophilus Kieffer, 1906, *Ann. Soc. sci. Brux.* **30** : 115, Syn. n.

By comparison with the Ichneumonidae, the absence, or imperfect development, of wings is comparatively rare in the Braconidae. *Pseudopezomachus* is of particular interest because it shows this very condition in a high degree of development in both sexes. Certain of the thoracic sclerites, such as the postscutellum, have been completely suppressed and the thorax approaches the semblance of being composed of two nodes. It thus has something of the curious appearance so characteristic of the Bethylid genus *Gonatopus* and certain sections of the Ichneumonid genus *Gelis*.

There are three other Alysiine genera in which the wings are either vestigial or shortened in one or both sexes. These are *Chasmodon* Haliday, *Panerema* Förster and *Alloea* Haliday; all of them have the postscutellum fully developed

and in this respect differ at once from *Pseudopezomachus*. In common with *Chasmodon* but differing from *Panerema* and *Alloea*, *Pseudopezomachus* has the fourth antennal segment longer than the third.

As far as is known, the distribution of *Pseudopezomachus* is entirely Mediterranean.

Pseudopezomachus masii sp. n. (fig. 1).

♂♀. Dark brown; the mesonotal area somewhat paler; the petiole dirty yellowish. Flagellar segments 1–2 yellow; 2–3 with a variable extent of yellow basally. Legs brown, the trochanters, base of tibiae and the tarsi paler, having a yellowish tint.

♀. *Head* much wider than the thorax, distinctly wider behind the eyes than across them. Hairs of the upper surface of the head very short, sparse and quite inconspicuous. Posterior margin of the head, especially at temples, and most of the occipital region with extremely close punctate-reticulation, sometimes appearing closely granulate. Ocelli arranged in a triangle the base of which is clearly shorter than its sides; posterior ocelli somewhat ill defined. Lower surface of frons, face, except broadly along the middle where it is smooth and shining, closely granulate. Antennae 22, 23 and 24 (3 ♀♀); antennal segment 4 considerably longer than 3. Mandibles 3-toothed, not at all characteristic. *Thorax*: Pronotum finely and very irregularly reticulated, about one and a half times as long as the middle distance between its posterior margin and the beginning of the propodeal incline. Mesonotum, scutellum and postscutellum fused to form a single sclerite. Wings absent; a minute, bud-like tubercle appears to represent the vestigial remains of the fore-wing. Propodeum very long, extremely closely reticulated; the sculpture anteriorly becomes somewhat obsolescent and the surface in consequence more shining. In a lateral view of the thorax (fig. 4), the propodeum rises only a little above the level of the anterior part of the thorax. Legs: hind femur, seen from above, markedly bent, slightly constricted at middle and rather abruptly dilated at apex; hind tibia almost without outstanding hairs along its outer side (fig. 8); the hairs otherwise extremely short and almost adpressed. *Abdomen*: Petiole about twice as long as apically wide, finely, obsoletely punctate-reticulate. Ovipositor concealed.

♂. Like the female but with a pair of highly modified fore-wings; these are about as long as the thorax, club-shaped, the stalk of the club being slender, filiform, the apex dilated to form a black, shining, somewhat flattened, club (fig. 2). The scutellum is indicated as a feeble, ill-defined convexity. Antennae 22, 23 and 24 (3 ♂♂).

Length: ♂♀, about 1·8 mm.

Tripolitania: Sidi Mezri, 3 ♀♀, one the type, 3 ♂♂, iv.1939 (*G. M. Martelli*). Type in British Museum, paratypes in Museo Civico di Storia Naturale, Genoa.

This species is of particular interest because of the curious oar-like wings of the male. I know of no similar wing modification in any other species of Braconidae.

I have pleasure in naming *Pseudopezomachus masii* in honour of Dr. Masi, to whom must be given credit for throwing much light on the relationships of the species within the genus.

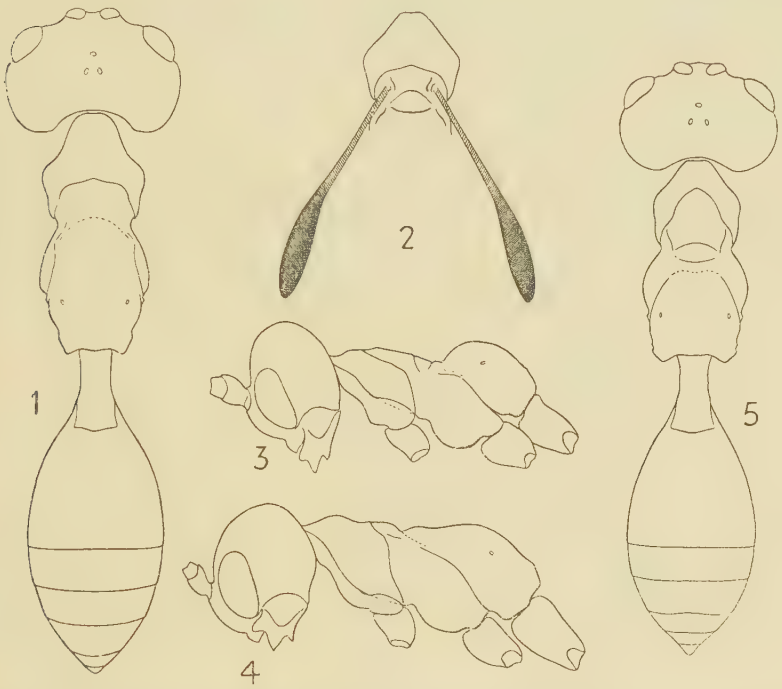
Apart from *Pseudopezomachus villosus* (Kieffer) (see below), the genus *Pseudopezomachus* now contains three species the females of which may be separated by the following key:—

1. Outer hairs of the hind tibia about 3 times as long as the middle width of the tibia (fig. 6); head smooth everywhere. (Sp. covered all over with very long, sparse, erect hairs similar to those of the hind tibia; pronotum much shorter than the middle distance between its posterior margin and the propodeum, about one-third as long; mesonotum about as long as its

greatest width (fig. 5); propodeum in lateral view of the thorax rising as a conspicuous convexity above the level of the rest of the thorax (fig. 3)) *bituberculatus* (Marshall).

Outer hairs of the hind tibia at most about as long as the middle width of the tibia; head sculptured at least around its posterior margin . . . . 2.

2. Outer hairs of the hind tibia about as long as the middle width of the tibia, outstanding (fig. 7); vertex all over with fine scaly-reticulation; petiole three times as long as its apical width, its spiracles very prominent; pronotum about equal in length to the middle distance between its posterior margin and the beginning of the propodeal incline (in a lateral view, the convexity of the propodeum is intermediate between that of *masii* and *bituberculatus*) . . . . . *cursitans* (Ferrière).



Figs. 1–5.—1. *Pseudopezomachus masii* sp. n., ♀, body (dorsal); 2. *P. masii* sp. n., ♂, wings and part of thorax; 3. *P. bituberculatus* (Marsh.), ♀, body (lateral); 4. *P. masii* sp. n., ♀, body (lateral); 5. *P. bituberculatus* (Marsh.), ♀, body (dorsal).

Outer hairs of the hind tibia very inconspicuous, almost absent, more or less adpressed; vertex sculptured only around its posterior margin; petiole twice as long as apically wide, its spiracles not prominent; pronotum about one and a half times as long as the middle distance between its posterior margin and the beginning of the propodeal incline . *masii* sp. n.

Pseudopezomachus cursitans (Ferrière).

Alysiella cursitans Ferrière, 1930, *SitzBer. Akad. Wiss. Wien* **139** (5, 6) : 397.
Pseudopezomachus cursitans (Ferrière), Masi, 1933, *Mem. Soc. ent. ital.* **12** : 39.

Ionian Is.: Corfu, Potamos, i.iv.1929 (*Beier*). So far only one specimen known, the type female, from which fig. 7 was made.

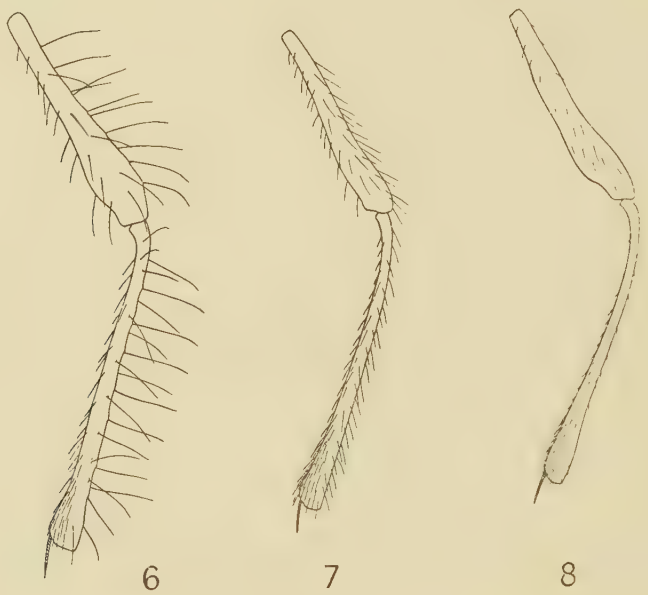
Pseudopezomachus bituberculatus (Marshall).

Ischnopus bituberculatus Marshall, 1905, *Ann. Mus. Stor. nat. Genova* **41** : 450, ♂.
Pseudopezomachus bituberculatus (Marshall), Mantero, 1905, *Ann. Mus. Stor. nat. Genova* **42** : 49.
Pseudopezomachus bituberculatus (Marshall), Masi, 1933, *Mem. Soc. ent. ital.* **12** : 38.

This species has the anterior face of the propodeal convexity smooth and shining, whereas in *cursitans*, which has a propodeum of much the same shape but less convex, this part is closely sculptured, the sculpture consisting of fine, close but more or less irregular reticulation.

Is. of Giglio, Isola, Elba and Capri. S. France : Hyères, 2 ♀♀, bred 14.v.1934, from dipterous leaf-miner in *Lepidum* (S. Garthside). Figs. 3 and 5 were drawn from a female from Hyères, but fig. 6 is of the leg of a female from Giglio (det. Masi).

In his paper, cited above, Dr. Masi gives a very detailed comparison of the sculptural differences between this species and *cursitans* Ferrière.



Figs. 6–8.—Hind femur and tibia of: 6. *Pseudopezomachus bituberculatus* (Marshall); 7. *P. cursitans* (Ferrière); 8. *P. masii* sp. n.

Pseudopezomachus villosus (Kieffer). New combination.

Libyophilus villosus Kieffer, 1906, *Ann. Soc. sci. Brux.* **30** : 115.

Masi has already pointed out (*loc. cit.* : 39) that this species may be identical with *bituberculatus* (Marsh.). If allowances be made for Kieffer's inability ever to give a figure that bore more than a superficial resemblance to the species he wished to illustrate, there is little in his description to suggest that Masi's surmise may not be right. Kieffer does say, though, that the third antennal segment of *villosus* is a little longer than the fourth, a statement which, if true, might question the correctness of the step I have taken in sinking the genus *Libyophilus* and certainly casts a doubt on the possible identity of the two species.

Algeria : Philippeville, 8 exs. taken in April (Coll. de Gaulle).

THE ORTHOPTERA SALTATORIA OF JERSEY, CHANNEL ISLANDS

By Frederick E. Zeuner, Ph.D., F.Z.S.

Communicated by Dr. O. W. Richards, F.R.E.S.

With Plate 1.

History of Investigation.

The earliest report on Saltatoria from Jersey is by Ansted and Latham (1865). They knew the following five species: *Gryllotalpa gryllotalpa*, *Gryllus campestris*, *Gryllulus domesticus*, *Tettigonia viridissima*, and *Oedipoda coerulescens*. Burr (1899) determined specimens caught by B. O. Cartwright and brought the number up to nine, adding *Platycleis grisea*, *Chorthippus bicolor*, *Ch. vagans*, and *Omocestus haemorrhoidalis*. Finally, Luff (1909) reviewed the fauna of Jersey again and confirmed the occurrence of certain species, but did not add any new names to the list.

In 1938 I had an opportunity to collect in Jersey between 27th August and 9th September with the result that the fauna now comprises no fewer than 17 species, some of them of outstanding interest.

List of Jersey Saltatoria, with notes and descriptions of new forms.

Gryllotalpidae.

1. *Gryllotalpa gryllotalpa* (L.). In Jersey Museum; caught by Luff.

Gryllidae.

2. *Gryllus campestris* L. In Jersey Museum; Luff: not uncommon *teste* Mr. Sinel.

3. *Gryllulus domesticus* (L.). Caught by Luff, in houses. Introduced by man.

Tettigoniidae.

4. *Meconema thalassinum* (de Geer). Longueville, a specimen caught by Mr. Mourant, given to me. Smaller than continental specimens.

5. *Tettigonia viridissima* L. In bushes, trees and brambles, on Portelet peninsula and elsewhere. Also caught by Luff.

6. **Platycleis occidentalis jerseyana** subsp. n. Portelet peninsula, Noirmont, Corbière, Pinacle, Quennevais (type locality). Also reported by Luff and Burr as *Platycleis grisea*. Occurs in Guernsey as well (specimens in British Museum, coll. *W. E. China*).

Diagnosis. Smaller than Continental and British specimens of *Platycleis occidentalis*. Elytra more slender and with a tendency to become shorter, not extending beyond the hind knees, and mostly not reaching them. Ovipositor more than half as long as the hind femur (less than half this length in the typical form), more slender and straighter than in the typical form, almost straight in its basal half. Figs. 1 (male, paratype), 2 (female, holotype). Compare with fig. 3, holotype of *Platycleis occidentalis* Zeuner.

Measurements, of females, in millimetres.

	Pronotum	Elytra	Hind femur	Ovipositor
P. o. jerseyana, holotype	4·6	17·6	17·3	9·2
P. o. jerseyana, largest paratype	4·75	18·4	17·8	10·1
P. occidentalis, holotype, Tübingen	5·8	21·6	21·5	9·4
P. occidentalis, Col d'Aspin, Pyrenees	6·0	21·5	21·0	9·7
P. occidentalis, Looe, Cornwall	5·8	20·5	20·5	10·0

Platycleis occidentalis Zeuner was first described in 1931 as a subspecies of *P. grisea* Fabr., with which it had been confounded. I have since convinced myself that it is a good species. The few specimens transitional between *P. grisea* and *occidentalis* from the districts in central Europe where the two forms meet have remained the only ones, and it is probable that they are hybrids. Although the two species are closely related, the subgenital plate of the female of *P. occidentalis* differs from the type observed in all other species of the genus. Specimens from west Germany, Great Britain and the whole of France all belong to *P. occidentalis*, and show comparatively little variation. In Spain a larger form occurs which may be a distinct subspecies. In the Channel Islands the interesting small form of which the diagnosis is given above is found. Its small size and slenderness, and the relatively long ovipositor, characterise it well.

7. *Pholidoptera cinerea* (L.). Handois.

8. *Conocephalus fuscus* (Fabr.). Crabbé, Noirmont, St. Ouen's Pond. This species normally occurs in grasslands near water, and often on reeds, but at Crabbé I found it on bracken and gorse.

9. *Leptophyes punctatissima* (Bosc.). One female was caught at Longueville by Mr. Mourant, who described it to me and later sent two photographs. It is certainly a *Leptophyes*, but for definite identification males are required. *L. punctatissima* is the most likely species.

Tetrigidae.

10. *Tetrix subulatus* (L.). I found this excellent flier in the Quennevais, in a railway cutting in dune sands, an unusual habitat for a water-loving species. Luff observed it in Guernsey.

Acrididae.

11. *Oedipoda coerulescens* (L.). Quennevais, and Cotte de St. Brelade. Also recorded by Burr and Luff. The specimens are much smaller than Continental ones, the Jersey females being of the size of the Continental males.

12. *Omocestus haemorrhoidalis* (Charp.). One specimen only, determined by Burr in 1899, and not found again.

13. *Chorthippus bicolor* (Charp.). Frequent in many places, *e.g.* Quennevais, Portelet peninsula, Noirmont. Also recorded by Burr and Luff.

14. *Chorthippus mollis* (Charp.). Quennevais.

15. *Chorthippus vagans* (Eversm.). Noirmont, Portelet peninsula, Ouainé Bay, Le Pinacle, Corbière, Quennevais. Reported also by Burr and Luff. This essentially southern species occurs in Jersey in a minute form, most

typically in the dry environment of the Quennevais (figs. 4 and 9). Apart from size, however, no diagnostic character could be detected, and the internal genitalia differ in no way from those of ordinary *Ch. vagans* from Russia, Germany, France and Spain. Moreover, specimens of almost normal size do occur in Jersey (figs. 5, 6, 7, 10), and there are plenty of transitional specimens. Yet the small form is easily recognisable in the field, where it might be mistaken for *Omocestus haemorrhoidalis*, and its stridulation differs from that of large *Ch. vagans* in being faster. This, however, may simply be a consequence of the small size. One has the impression that a geographical race is beginning to develop, but the characters are as yet insufficient to establish a subspecies. This is borne out by the following measurements :

Length, head to tip of elytra, in millimetres :

Males.		Females.	
Quennevais (fig. 4)	10·5	Quennevais (fig. 9)	14·8
Quennevais (fig. 5)	11·9	Grünau near Berlin	17·0
Corbière (fig. 6)	13·0	Noirmont (fig. 10)	17·3
Grünau near Berlin	13·6	Fontainebleau (fig. 11)	19·9
Portelet (fig. 7)	14·1		
Fontainebleau (fig. 8)	14·8		

16. *Chorthippus parallelus* (Zett.). Noirmont, Portelet peninsula, St. Ouen's Pond, Devil's Hole.

17. **Euchorthippus elegantulus** sp. n. Quennevais, Ouainé Bay, St. Ouen's Pond.

Diagnosis. A *Euchorthippus* related to *E. declivus* Brisout, but smaller and more slender. Head proportionately longer, genae less thickened. Median and lateral carinae of the pronotum very pronounced for the genus. Elytra noticeably shortened, not quite reaching the hind knees. External genitalia resembling those of *E. declivus*. General habitus strongly reminiscent of *Chorthippus albomarginatus* (de Geer) (syn. *Ch. elegans* Charp.). Figs. 14, 15, males; 20, 21, females.

Measurements, lengths, in millimetres.

	head + pronotum	head to tip of abdomen	hind femur	elytra	proportion $\frac{\text{head + pron.}}{\text{femur}}$
E. elegantulus, male, holotype, Jersey	4·5	12·2	8·1	8·5	5·55
E. declivus, male, Fontainebleau (type locality)	5·7	15·0	9·5	8·7	6·0
E. declivus, male, Mt. Courmette, Alpes Maritimes	6·0	17·0	9·1	9·2	6·6
E. elegantulus, female, paratype, Jersey	5·9	17·0	10·6	10·6	5·6
E. declivus, female, ?paratype, St. Germain	6·4	19·1	12·2	9·3	5·25
E. declivus, female, Alpes Maritimes, 800 ft.	8·2	23·8	14·6	14·0	5·6

Remarks. It is evident that this species is derived from *E. declivus*, which, however, does not appear to occur north of Paris. *E. elegantulus* is well

distinguished by its resemblance to *Chorthippus albomarginatus* and its minute size.

Localities.

Portelet peninsula. A peninsula on the south coast, with flat top covered by fields, with shrubs and trees along borders.

Noirmont. Road leading down to the sea from the plateau of Portelet peninsula, and adjacent fields and scrub on slope facing east. Most specimens caught in grass beside tomato fields.

Cotte de St. Brelade. South-west portion of Portelet peninsula. Grassy heathland with plenty of gorse and many barren, rocky or gravelly spots.

Ouainé Bay. A small bay just west of Portelet peninsula, with sand dunes, partly moving, partly overgrown with short grass. Gorse present. Saltatoria in the grassy depressions between the dunes.

Quennevais. An area of about one square mile, near the south-west corner of the island, of consolidated dunes covered with mostly very sparse vegetation. In the depressions between the dunes carpets of very short, dry grass and other plants occur, and spinose species abound everywhere. Through this area runs the cutting of the abandoned railway line, and as this is protected from wind, exceedingly high temperatures develop here while the sun shines. This is the spot where southern elements are frequent and where the dwarf *Chorthippus vagans* is abundant, together with *Euchorthippus elegantulus*, *Platycleis occidentalis jerseyana*, *Oedipoda coerulescens*, etc.

La Corbière. The south-west tip of Jersey. Plateau over cliffs, exposed to strong wind. Short, grassy surface with some gorse and brambles.

St. Ouen's Pond. Pond in the dune belt of the west coast, surrounded by a belt of reeds and swampy grassland, passing into dry, short grass on sand. This latter biotope with *E. elegantulus*.

Le Pinacle. An almost isolated rock on the west coast, connected with main island by a neck, covered with rather short grass. Barren spots frequent. Exposed situation.

Crabbé. Heath of bracken and gorse on top of the cliff on the north coast.

Devil's Hole. As Crabbé.

Handois. Cultivated interior of the island. Hedges and brambles near a quarry.

Longueville. Cultivated interior of the island. Tomato plantations, garden land, trees and brushes.

General Remarks on Composition and Age of the Fauna.

The main feature of the Jersey fauna is the comparative frequency of forms which are fond of, or require, warm summers, namely *Gryllus campestris*, *Platycleis occidentalis* (ssp. *jerseyana*), *Chorthippus vagans*, *Euchorthippus elegantulus*, and *Oedipoda coerulescens*. Of these, only the first two occur with certainty in Britain, *G. campestris* being rare and chiefly restricted to the south, and *P. occidentalis* (in the typical form) being entirely restricted to the south coast (Burr, 1936). *Oe. coerulescens* and *Ch. vagans* have each been recorded once. Their occurrence in Britain requires confirmation.

The frequency of heat-loving grasshoppers in Jersey is even more pronounced if the number of individuals is taken into account. The fauna of the adjacent parts of France appears to be more of the normal central and west European type, and *Euchorthippus* and *Chorthippus vagans* are at least extremely rare there, if they occur at all.

If one compares the fauna of Jersey with that of Guernsey, which island, climatically, resembles the former in many respects, one finds that only well-

flying species occur in Guernsey. Not more than 7 species have been recorded from Guernsey by Luff, compared with 17 from Jersey, namely *Gryllulus domesticus*, *Gryllotalpa gryllotalpa*, *Tettigonia viridissima*, *Platycleis occidentalis jerseyana*, *Tetrix subulatus*, *Oedipoda coerulescens* and *Chorthippus bicolor*. The same difference between Guernsey and Jersey is observed in the vertebrate fauna (Sinel, 1909). Of the reptiles and amphibia, only the Slow-worm (*Anguis fragilis*) has reached Guernsey, whilst Jersey possesses the frog, toad, smooth and palmated newts, ring-snake, and wall-lizard (*Lacerta muralis*) and green lizard (*Lacerta viridis*). The last two are Mediterranean species. It is obvious that the faunal difference between the two islands cannot be due to climatic differences; it must have geographical reasons. Guernsey lies farther away from the Continent, and a stretch of fairly deep water separates it from Jersey and the Continent. Between Jersey and the Continent, however, there is a broad submarine connection less than 10 fathoms deep (fig. 25).

Fig. 25.—The 10 Fathom line in the sea near Jersey. After R. R. Marett, 1911, *Archaeologia*, Oxford, **62** : 454.

The results of geological work on the glacial and Postglacial history of the Channel Islands, and on the submergence of the North Sea and the Straits of Dover in particular, provide a satisfactory explanation for the character of the fauna of Jersey. At the maximum of the last glaciation, the Channel Islands, which were not glaciated, were under a cold steppe climate and the subsoil was permanently frozen. These conditions were unsuitable for nearly all the species now found in the Channel Islands. At the same time, the sea-level was low. During the Postglacial period, the climate improved rapidly, and at about 10–5000 B.C. a Continental climate with warm summers and cold winters prevailed. Species from east Europe and Asia spread rapidly over central and west Europe during that time (Boreal phase) and certain Mediterranean forms spread north- and eastwards. The sea-level rose during the Boreal and, towards its end, had practically reached the present level. The separation of Guernsey from Jersey and the Continent must have taken place early, not later than the beginning of the Boreal phase. Warmth-loving species had not yet spread at that time. Jersey, on the other hand, was connected with the Continent throughout the Boreal with its favourable conditions, and there was ample opportunity for warmth-loving species to immigrate.

At the end of the Boreal, Jersey had become severed from the Continent, and the climate took a turn towards more oceanic conditions everywhere in temperate Europe. The consequence was a spreading of many species which are content with a fairly damp summer, and many of the Boreal immigrants on the Continent withdrew southwards or became restricted to " relict " localities. This also applies to the north and west of France, but in Jersey the Boreal immigrants were the only ones which reached the island, and they still abound there in suitable localities. Morphological modifications took place, possibly as adaptions to island conditions and to the more humid climate, smallness being the dominant character. One species and at least one good subspecies were evolved among the Saltatoria. For this process of species-formation a time-limit is given by the known age of the Boreal phase. Therefore one can say that, in this particular case, the formation of a species required approximately 10,000 years or, generations in Saltatoria being annual, 10,000 generations.

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Plate 1.

Figs. 1–2. *Platycleis occidentalis jerseyana* ssp. n., fig. 1, paratype, male, fig. 2, holotype, female, both nat. size, Quennevais, Jersey.

Fig. 3. *Platycleis occidentalis* Zeuner, holotype, female. Tübingen, Germany. Nat. size.

Figs. 4–8. *Chorthippus vagans* Eversm., males, twice nat. size. Fig. 4 and 5 from Quennevais, Jersey, 6 from Corbière, 7 from Portelet, both Jersey, 8 from Fontainebleau near Paris.

9–11. *Chorthippus vagans* Eversm., females, twice nat. size. Fig. 9 from Quennevais, 10 from Noirmont, both Jersey, 11 from Fontainebleau near Paris.

12–13. *Chorthippus albomarginatus* (de Geer), males, twice nat. size. 12 from Zoppot near Dantzig, 13 from Wünsdorf near Berlin.

14–15. *Euchorthippus elegantulus* n. sp., males, twice nat. size. 14, holotype, Ouainé Bay; 15, paratype, Quennevais, both Jersey.

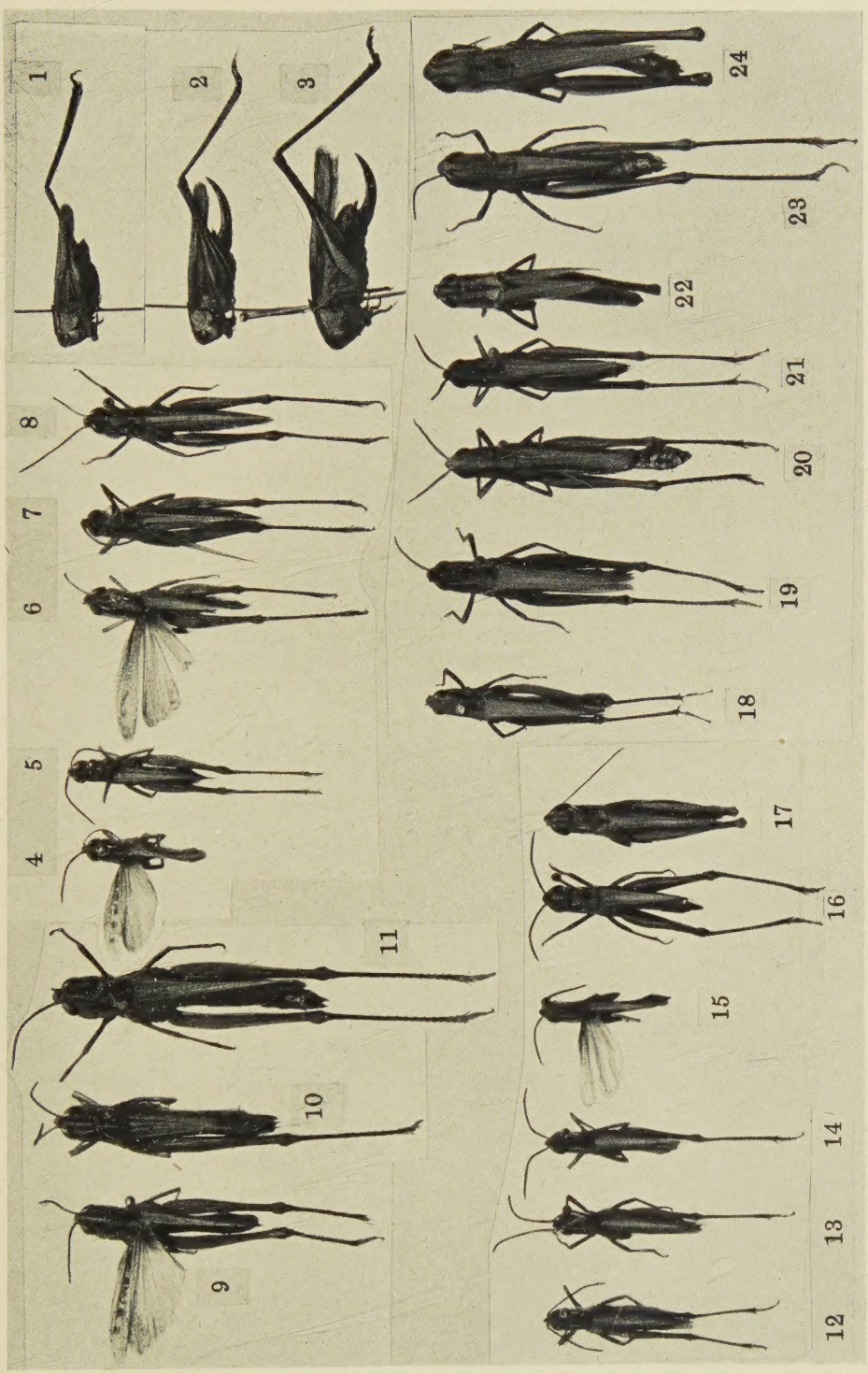
16–17. *Euchorthippus declivus* Brisout, males, twice nat. size. 16, Fontainebleau; 17, Alpes Maritimes.

18–19. *Chorthippus albomarginatus* (de Geer), females, twice nat. size. 18, Berlin; 19, Sperenberg near Berlin.

20–21. *Euchorthippus elegantulus* sp. n., females, paratypes, twice nat. size. 20, St. Ouen's Pond; 21, Ouainé Bay, both Jersey.

22–24. *Euchorthippus declivus* Brisout, females, twice nat. size. 22, St. Germain near Paris, probably a paratype; 23, Episy near Paris; 24, Alpes Maritimes.

Holotypes and paratypes in the British Museum (Natural History), and my collection.



ENGRAVED BY STAR ILLUSTRATION, LONDON.

F. E. Zeuner. **Orthoptera** *of Jersey.*

A REVISION OF THE MALAYAN SPECIES OF *LOGANIA* DIST. (LEPIDOPTERA: LYCAENIDAE)

By A. Steven Corbet, F.R.E.S.

The genus *Logania* Dist. was revised by Fruhstorfer (1914, *Z. wiss. InsektBiol.* **10**: 22–25 and 1916, in Seitz, *Grossschmett. Erde* **9**: 805–808), who separated the 4 Malaysian species into 7 species groups. This was largely due to the remarkable variability shown by *L. marmorata* Mre., which species has received many redundant names. The male genitalia show the usual features of the subfamily Miletinae: with *L. marmorata* and *L. massalia* the clasper exhibits some individual variation and this organ cannot be satisfactorily used to differentiate between these species.

The butterflies are very local in distribution, being found in primary forest and remaining in certain spots over a period of years. Nothing appears to be known regarding the early stages.

Logania Dist.

Logania Distant, 1884, *Rhop. Malay.*: 208. Type = *Logania malayica* Dist.
Malais Doherty, 1889, *J. asiat. Soc. Bengal* **59**: 436. Type = *Logania sriwa* Dist.

Key for the separation of the Malaysian species of *Logania* Dist.

1(2). F apex prolonged to a point in both sexes. Legs unicolored dark brown. Up white, with F black subapical border . . . . . *malayica.*
2. F apex not pointed. Legs brown ringed with white or buff.
3(4). UnH with a broad white streak extending from base to termen and passing through the upper part of the cell, and contrasting sharply with the dark ground. Up white, with broad, black subapical border on F: H sometimes dusky . . . . . *regina.*
4. UnH without a prominent white streak as in *regina*. Up dark brown, usually with at least a white discal patch on F, although both wings may be white, except for broad dark brown subapical border on F and narrow dark diffuse border on H.
5(6). F termen crenulate. Un marbled with black and white, and various shades of dark brown and ochreous: post-discal fascia on F not discernible . . . . . *marmorata.*
6. F termen entire. Un pale rusty ochreous brown, faintly striated: the usual cell-end stripes and post-discal fasciae can be faintly discerned. *massalia.*

Logania malayica malayica Dist.

Logania malayica Distant, 1884, *Rhop. Malay.*: 208, pl. xxii, f. 21 ♀; Malay Peninsula.
Logania malayica Fruhstorfer, 1916, Seitz, *Grossschmett. Erde* **9**: 805, pl. 141 f 8 ♂

The species occurs in Malaya, Sumatra and Borneo without modification. In the Peninsula, it is very local and found flying at bushes in primary forest. It appears to be confined to the plains.

Logania regina sriwa Dist.

Miletus regina H. Druce, 1873, *Proc. zool. Soc. Lond.* **1873**: 348, pl. xxxii, f. 4 ♂; Borneo.
Logania sriwa Distant, 1886, *Ann. Mag. nat. Hist.* (5) **17**: 531; Malacca. 1886, *Rhop. Malay.* 452, pl. xliv, f. 16 ♀.
Logania sriwa Fruhstorfer, 1916, Seitz, *Grossschmett. Erde* **9**: 805, pl. 141 f 6 ♀, 7 und.

Sumatran specimens are not separable from those from the Malay Peninsula.

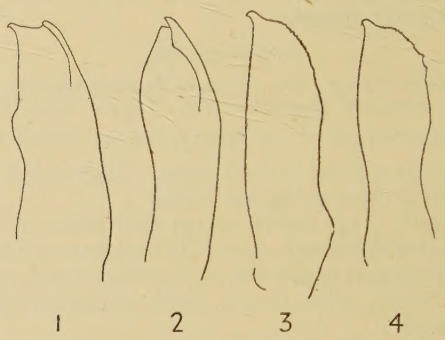
Logania marmorata damis Fruh.

Logania marmorata Moore, 1884, *J. asiat. Soc. Bengal* **53**: 22; Mergui. Type figured in de Nicéville, 1890, *Butt. India, Burmah & Ceylon* **3**, frontispiece, f. 128.
Logania massalia damis Fruhstorfer, 1914, *Z. wiss. InsektBiol.* **10**: 24; ♂, Singapore.
Logania luca luca Fruhstorfer *nec* de Nicéville, 1916, Seitz, *Grossschmett. Erde* **9**: 806.

Logania marmorata marmorata Fruhstorfer (*partim*), 1916, Seitz, *Grossschmett. Erde* **9** : 806, pl. 141 f 9 ♂, 10 ♀.

The " co-type " of *luca* stated in Seitz to be in the Fruhstorfer collection is a *marmorata* female from Namoe Oekor, Sumatra; it was taken in January 1893 and not in October 1893 as were de Nicéville's types.

This very variable species is distributed from Assam, through Malaysia, to the Celebes and Philippines. In Burma, Malaya, Sumatra and Borneo, the species is fairly constant: it is usually dark brown above with the basal half of the fore-wing white, although the hind-wing is sometimes mostly white in the female. In Nias (subspecies *lahomius* (Kheil)), both sexes are similar to *L. regina* above, while in Java, Palawan and the Celebes, the male is entirely dark brown above, except for a white rounded discal spot on the fore-wing as in *L. massalia*: in the Celebian female (*obscurus* (Röb.)) the upperside is entirely dark brown. It is hardly surprising, therefore, that the races of *L. marmorata*



FIGS. 1–4.—Male clasper of (1) *Logania malayica malayica* Dist., Malaya, (2) *L. regina sriwa* Dist., Malaya, (3) *L. marmorata damis* Fruh., Malaya, (4) *L. massalia drucei* Moult., Borneo. All drawings of the same magnification.

have received such a host of names, and, in addition to those mentioned above, the following forms have been ascertained to be *marmorata* subspecies: *subfasciata* Tytler, Assam, probably a synonym of *watsoniana* Nic., Upper Burma, *hilaeira* Fruh. (= *nada* Fruh. **syn. n.**), North-east Sumatra, *staudingeri* H. H. Drc., Kina Balu from which *stenosa* Fruh., South-west Borneo, *cineraria* Fruh. (= *obscura* Dist. & Pryer *praeocc.*), Sandakan, and *sora* Fruh., North Borneo, are probably not to be separated; *javanica* Fruh. (= *glypha* Fruh. **syn. n.**), East Java (Piepers & Snellen, pl. xx, f. 21 ♂) and of which *munichya* Fruh. West Java (Piepers & Snellen, pl. xx, f. 22a ♂, b ♀) appears to be a synonym.

Logania massalia luca Nic.

Logania massalia Doherty, 1891, *J. asiat. Soc. Bengal* **60** : 37, pl. i, f. 8 ♂ *nec* " ♀ "; Upper Assam.
Logania luca de Nicéville, 1894, *J. asiat. Soc. Bengal* **63** : 28, pl. ii, f. 13 ♀; North-east Sumatra.

The nominotypical form (Seitz, pl. 141 f 11 ♂) occurs in Assam and Burma: the further subspecies *drucei* Moult., Borneo, hardly differs from the Malayan form. In two males from Johore (Lombong, 11.xii.1938, *J. N. Eliot*), taken at the same time as a normal *luca* female, the fore-wing is entirely blackish-brown, except for the pale brand along the base of vein 4.

Of the *Logania* forms mentioned in this paper, the types of the following have been examined in the British Museum: *drucei* Moult., *massalia* Doh., *regina* H. Drc., *subfasciata* Tytler, and all those described by Fruhstorfer except *cineraria*. I am indebted to Captains C. F. Cowan and J. N. Eliot, of the Royal Artillery, for the loan of series of Malayan *L. regina* and *L. massalia*.